Africa RISING Ethiopia

2014 Work plan

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The Africa Research In Sustainable Intensification for the Next Generation (Africa RISING) program comprises three research-for-development projects supported by the United States Agency for International Development as part of the U.S. government's Feed the Future initiative.

Through action research and development partnerships, Africa RISING will create opportunities for smallholder farm households to move out of hunger and poverty through sustainably intensified farming systems that improve food, nutrition, and income security, particularly for women and children, and conserve or enhance the natural resource base.

The three regional projects are led by the International Institute of Tropical Agriculture (in West Africa and East and Southern Africa) and the International Livestock Research Institute (in the Ethiopian Highlands). The International Food Policy Research Institute leads the program's monitoring, evaluation and impact assessment. http://africa-rising.net/

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List of Themes

The key themes identified for clustering Africa RISING's research activities in the Ethiopian Highlands are:

1. Feed and Forage Development.
2. Field Crop Varietal Selection and Management.
3. Integration of High Value Products into Mixed Farming Systems.
4. Improved Land and Water Management for Sustainability.
5. Improving the Efficiency of Mixed Farming Systems through more Effective Crop - Livestock Integration.
6. Cross Cutting Problems and Opportunities.
7. Knowledge Management, Exchange and Capacity Development.

Theme 1: Feed and Forage Development

Core problem or opportunity	Possible actions	Research Questions	Research Activities (including methods)	Research Locations	Partners
Availability of livestock feeds including fodder and forage is inadequate to support intensification.	1. Establish the use of improved fodder / forage varieties that can be integrated effectively into the target systems.	1.1. What niches are available on farms that could accomodate a range of planted or other forage species?	1.1.1. Evaluation of existing fodder / feed utilisation practices using the FEAST tool. 1.1.2. Pre-screening of potential interventions using Techfit and ex ante systems modeling to assess broader impacts. 1.1.3. On farm evaluations of promising feed and forage combinations for different productions systems.	All Africa RISING sites.	ILRI, ICRAF, Site teams.
	2. Introduce viable options for improving crop residue / by product (including "weeds") utilisation (quantity, quality, management).	2.1. What opportunities exist for improving crop residue utilisation though improved ration specification or treatment?	2.1.1. Inventorise crop residue utilisation by production system at the Africa RISING sites (based on FEAST + more detailed study). 2.1.2. Assessment of the system-level trade-offs that are likely to influence the viability of these utilisation opportunities (whole system modeling)	All Africa RISING sites.	ILRI, ICARDA, CIP, Site teams.

		2.1.3. Cost-benefit analysis and assessment of the marketability of improved crop residues. 2.1.4. Implement on-farm evaluations of improved crop residue utilisation techniques.		
3. Introduce viable opportunities for closing fodder gaps by applying improved conservation / storage techniques.	3.1. What forage crops or crop residues might be economically stored for off-season use?	3.1.1. Review storage / conservation practices for the range of feeds available (based on FEAST / Techfit assessments). 3.1.2. Explore any requirements to adapt these practices to local circumstances. 3.1.3. Assess viability of different storage practices with farmers.		
4. Establish the options for introducing forage production under irrigation.	4.1. Under what conditions and for which production systems is irrigated forage production a viable option?	4.1.1. Identify production systems that can target high return opportunities for livestock products. 4.1.2. Design and test forage production systems under irrigation that can complement the existing feed resource base. 4.1.3. Evaluate water use trade-offs against other options for irrigable land.	Lemo, initially.	ILRI, IWMI, Small Scale Irrigation RFP. Site teams.

Feed management practices fail to make optimum use of the feed resources that are, or could be, available.	5. Expand the use of available biomass in project communities (including CPRs).	5.1. How can any under-utilised biomass contribute to the existing feed resource base?	5.1.1. Conduct a broad-based study of biomass availability and assess potential feed values and trade-offs. 5.1.2. Incorporate promising sources of feed biomass into research conducted under Action 1.	All Africa RISING sites.	ILRI, ICRAF, Site teams.
	6. Capitalise upon the feed dividend that may accrue from intensified cropping activiities.	6.1. What residues or by-products of cropping systems have potential contribute to the feed	6.1.1. Review cropping systems evolution and predict implications for feed supplies (quantity and 6.1.2. Incorporate promising sources of feed biomass into research conducted under Action 1.	All Africa RISING sites.	All partners.
Overgrazing of pastures leads to long-term land degradation.	7. Identify management options to reduce the adverse impact of overgrazing.	7.1. What factors are driving pasture degradation at the AR sites?	7.1.1. Review existing studies of pasture mangement in the Ethiopian Highlands. 7.1.2. Conduct participatory assessment of pasture degradation with farmers /	All Africa RISING sites.	ILRI, CIAT, ICRAF, Site teams.
		7.2. What sustainable management interventions are suitable for reducing	7.2.1. Formulate remedial protocols for reseeding, establishment of enclosures, 7.2.2. Test and review protocols or combinations of protocols with farmers /	All Africa RISING sites.	

Improved pastures may improve the productive efficency of livestock within the system.	8. Introduce pasture species with the potential to improve pasture productivity and quality.	8.1. What improved pasture species are suitable for existing pastures at the AR sites?	8.1.1. Survey botanical composition, productivity and quality of existing pastures. 8.1.2. Identify candidate species for testing as part of uimproved pastures. 8.1.3. Test approaches to integration and management of improved pastures 8.1.4. Review outcomes in terms of livestock productivity and impacts on other system components.	All Africa RISING sites.	ILRI, CIAT, Site teams.

Summary List of Actions to Prioritise

	Priority (1 - 8)
T1 - 1: Establish the use of improved fodder / forage varieties that can be integrated effectively into the target systems.	
T1 - 2: Introduce viable options for improving crop residue / by product (including "weeds") utilisation (quantity, quality, management).	
T1 - 3: Introduce viable opportunities for closing fodder gaps by applying improved conservation / storage techniques.	
T1 - 4: Establish the options for introducing forage production under irrigation.	
T1 - 5: Expand the use of available biomass in project communities (including CPRs).	
T1 - 6: Capitalise upon the feed dividend that may accrue from intensified cropping activiities.	
T1 - 7: Identify management options to reduce the adverse impact of overgrazing.	
T1 - 8: Introduce pasture species with the potential to improve pasture productivity and quality.	

Theme 2: Field Crop Varietal Selection and Management

Core problem or opportunity	Possible actions	Research Questions	Research Activities (including methods)	Research Locations	Partners
Yields acheived with existing crop varieties and management are low.	1. Introduction of appropriate, improved varieties	1.1. What available varieties are more effective in meeting farmers' needs under intensification?	1.1.1. Review available varieties for niches found at Africa RISING sites. 1.1.2. Implement participatory varietal selection programme.	All Africa RISING sites.	CIP, ICARDA, CIAT, Site teams.
	2. Support wider adoption of appropriate and complementary management practices.	2.1. What fertilizer regimes are appropriate for intensification under local conditions.	2.1.1. Review information on locally targeted fertilizer recommendations. 2.1.2. Participatory evaluation of alternative fertilizer regimes for improved varieties (aligned with 1.1.2. above).	All Africa RISING sites.	CIP, ICARDA, CIAT, ATA, Site teams.
		2.2. What managment practices (including pest and disease management, management of other stresses) are appropriate for intensification under local conditions.	2.2.1. Review and evaluate incompatibilities between exisiting and improved management practices required for optimum production from improved varieties (aligned with 1.1.2. above).		

	2.2.2. Trade-off analysis to evaluate the feasibility of improved management practices. 2.2.3. Participatory evaluation of improved management practises in conjunction with new varieties.
2.3. What opportunities exist for improving land use efficiency ratios (e.g. rotations / intercropping)	2.3.1. Review options for intercropping key crops (including forages) at Africa RISING sites. 2.3.2. Participatory evaluation of improved rotations / intercrops in conjunction with new varieties.

Summary List of Research Actions to Prioritise *Priority (1 - 2)*

T2 - 1: Introduction of appropriate, improved varieties.

T2 - 2: Support wider adoption of appropriate and complementary management practices.

Theme 3: Integration of High Value Products into Mixed Farming Systems

Core problem or opportunity	Possible actions	Research Questions	Research Activities (including methods)	Research Locations	Partners
Lack of familiarity with the opportunities that high value products can offer.	1. Establish wider adoption of high value crops.	1.1. How can farmers' awareness of the benefits of planting and marketing high value crops be raised?	1.1.1. Survey existing benefits derived from high value products in target systems. 1.1.2. Establish the potential for wider adoption of these production systems (linked to T7 - 3.1.). 1.1.3. Design, implement and evaluate an awareness raising campaign for high value product adoption.	All Africa RISING sites.	ICRAF, CIP, Bioversity, CIAT, IWMI, ILRI, Site teams.
		1.2. What niches exist for intensification through the introduction of high value crops?	1.2.1. Identify niche, high value products with the potential to complement existing cropping / livestock systems. 1.2.1. Evaluation of potential constraints to the adoption of these products (including market forces).		

		1.2.3. Participatory evaluation of production systems for high value products.	

Theme 4: Improved Land and Water Management for Sustainability.

Core problem or opportunity	Possible actions	Research Questions	Research Activities (including methods)	Research Locations	Partners
Availability of water limits the viability of many crop-related agricultural intensification options.	1. Improve access to water resources.	1.1. What factors influence (both positively and negatively) the access of households and communities to water resources?	1.1.1. Inventorise the factors affecting access to water resources by differentiated stakeholder groups. 1.2.1. Develop and implement water access improvement plans mediated via the kebele and woreda level IPs. 1.2.3. Document recommendations for scaling based on the outcomes to this question.	All Africa RISING sites.	IWMI, ILRI, CIP, Site teams.
	2. Establish the use of improved water handling and management technologies.	2.1. What water management options are appropriate for farmers?	improved water management could help to drive sustainable intensification.	All Africa RISING sites.	IWMI, ILRI, CIP, ICARDA, CIAT, ICRAF, Site teams.

			2.1.2. Identify and test (at household or wider scales) appropriate and sustainable water management solutions to address those niches (linked to the activites of Themes 1 - 3).		
Continuing depletion of soil fertility	3. Establish the use of cropping interventions and land managment practices that counteract soil fertility depletion.	3.1. What are the principle problems associated with soil fertility depletion and how may they be addressed?	3.1.1. Identify the key soil fertility problems faced by farmers and construct an inventory of possible solutions. 3.1.2. Conduct *ex ante* impact assessment and trade-off analysis with crop - soil simulation models. 3.1.3. Pilot cropping and land management interventions on-farm.	All Africa RISING sites.	CIP, ICARDA, CIAT, ICRAF, ATA, Site teams.
Continuing soil erosion.	4. Establish the use of sustainable land managment practices that counteract soil erosion.	4.1. What are the major factors predisposing different landscapes to soil erosion and how may they be alleviated?	4.1.1. Inventory of threats to soil stability on farms (deforestation, surface run-off etc.). 4.1.2. Particpatory assessment of alternative erosion management options.	All Africa RISING sites.	CIP, ICARDA, CIAT, ICRAF, Site teams.

Summary List of Research Actions to Prioritise *Priority (1 - 4)*

T4 - 1: Improve access to water resources.	
T4 - 2: Establish the use of improved water handling and management technologies	
T4 - 3: Establish the use of cropping interventions and land managment practices that counteract soil fertility depletion.	
T4 - 4: Establish the use of sustainable land managment practices that counteract soil erosion.	

Theme 5: Improving the Efficiency of Mixed Farming Systems through more Effective Crop - Livestock Integration

Core problem or opportunity	Possible actions	Research Questions	Research Activities (including methods)	Research Locations	Partners
There is scope to improve system design in ways that are adaptable to farm conditions. (spatial and temporal integration).	1. Design biomass-efficient integrated systems.	1.1. What are the key synergies and trade-offs in biomass and nutrient-efficient integrated systems?	1.1.1. Assemble and inventory of existing and novel systems components that are applicable to the Africa RISING research sites. 1.2.2. Conduct systems modeling exercises for testing, adaptation and *ex ante* impact assessment (ILRI systems models, POLYSCAPE etc.). 1.2.3. Ensure that the findings feed into ongoing research planning for Themes 1 - 4.	All Africa RISING sites.	ILRI, ICRAF.
There is scope for more effective crop - tree - livestock integration.	2. Establish optimal crop residue / manure-compost use strategies for crop livestock systems.	2.1. What are the key trade-offs around crop residue use and how may they be optimised?	2.1.1. Use systems models to examine biophyscal implications of alternative crop residue management and utilisation strategies. 2.1.2. Implement bio-economic models for crop residue trade-off analysis.	All Africa RISING sites.	ILRI, CIP, CIAT, ICARDA, External partners required (ICRISAT Zimbabwe, University of Minnesota; pick up on past SLP work)?

		2.2.3. Ensure that the findings feed into ongoing research planning for Themes 1 - 3.		
	2.2. Is intensification of manure-compost use a viable option for increasing productive efficiency?	2.2.1. Inventory manure compost production and availability on farms and identify potential opportunities to expand this. 2.2.2. *Ex ante* impact assessments of improved manure ompost management regimes. 2.1.3. On-farm assessments of improved manure compost production and management techniques. 2.2.4. Ensure that the findings feed into ongoing research planning for Themes 1 - 3.		
3. Promote the integration of multipurpose trees into the target farming systems.	3.1.1. How can suitable multi-purpose tree species be effectively integrated into the farming system?	3.1.1. Identify niche options for trees (e.g. fodder, fertility management, fuel, construction etc) and species (including indigenous species) with the potential to fill these. 3.1.2. On-farm testing and evaluation of promising species.	All Africa RISING sites.	ICRAF, ILRI, CIP, ICARDA, Site teams.

			3.1.3. Establish and test appropriate multiplication and distribution processes.		
	4. Improve efficiency of Enset - livestock systems	4.1. Can improved crop handling / hygiene lower the incidence of bacterial wilt?	4.1.1. Identify options for improving tool hygiene 4.1.2. Test the impacts of improved tool hygiene methods; 4.1.3. Review adaptation options with participating farmers.	Lemo	ILRI, IWMI, ICRAF, Bioversity, IP partners, Hawassa University
		4.2. Are there sustainable chemical or biological treatments that farmers can implement to reduce the impacts of bacterial wilt?	4.2.1. Review treatment options for bacterial wilt 4.2.2. Conduct feasibility study on their applicability at AR sites. 4.2.3. If feasible test promising options on-farm.		
There is scope to improve the integration of on-farm and off-farm resources (including CPRs)	5. Establish the potential for underutilised sources of off-farm biomass to contribute to intensification.	5.1. How can any under-utilised biomass contribute to the existing feed resource base?	Addressed under T1 - 5.	All Africa RISING sites.	ICRAF, ILRI, CIP, ICARDA, Site teams.

		5.2. How can any under-utilised biomass contribute to organic matter enhancement	5.2.1. Conduct a broad-based study of biomass availability (linked to T1, Research Acivity 5.1.1.) and assess potential values for soil enhancement. 5.2.2. On-farm feasibility study of off-farm biomass use for soil enhancement.	

Summary List of Research Actions to Prioritise

	Priority (1 - 5)
T5 - 1: Design biomass-efficient integrated systems.	
T5 - 2: Establish optimal crop residue / manure-compost use strategies for crop livestock systems.	
T5 - 3: Promote the integration of multipurpose trees into the target farming systems.	
T5 - 4: Improve efficiency of Enset - livestock systems	
T5 - 5: Establish the potential for underutilised sources of off-farm biomass to contribute to intensification.	

Theme 6: Cross Cutting Problems and Opportunities.

Core problem or opportunity	Possible actions	Research Questions	Research Activities (including methods)	Research Locations	Partners
Shortage (limited availability) of seed and seedlings of field, forage and high value crops (Themes 1 - 3).	1. Support the establishment of sustainable seed and seedling supply systems.	1.1. What are the features of a sustainable seed supply system?	1.1.1. Review past literature on sustainable seed supply systems globally and previous experiences in Ethiopia. 1.1.2. Produce design templates for seed supply systems for key Africa RISING crops (including feeds and forages) and tree species.	All Africa RISING sites.	CIP, ~~ICRAF~~, ICARDA, ILRI BMGF Feedseed project.
		1.2. How can seed supply systems that support sustainable intensfication be established?	1.2.1. Establish pilot seed supply systems via Innovation Platform and other partners. 1.2.2. Document experiences and identify constraints to and opportunities for wider scaling.	All Africa RISING sites.	CIP, ICRAF, ICARDA, ILRI BMGF Feedseed project.
Post harvest practices are labour intensive, ineffective and do not add the maximum value for the farmer (Themes 1 -3).	2. Identify and introduce improved post harvest management practices.	2.1. What are the opportunities for reducing losses retaining quality of stored products?	2.1.1. Identify major threats to products that are currently stored by farmers.	All Africa RISING sites.	ILRI, ICARDA, CIP, Site teams. We may need to identify new partners for this too.

			2.1.2. Literature review and cost-benefit analysis on potential loss reduction practices. 2.1.3. Assess viability of different loss reduction practices with farmers.		
Marketing arrangements (input and output) for agricultural products do not always allow farmers to participate equitably	3. Support the establishment of sustainable market chains for agricultural products.	3.1. What are the entry points for strengthening market participation by farmers and how may they be exploited?	3.1.1. Value chain studies to characterise key market oppportunties and constraints at Africa RISING sites. 3.1.2. Determine effectiveness and impact on input and output marketing interventions for crop and livestock products. 3.1.3. Determine social and economic costs and benefits of new crop and livestock products for new emerging markets	All Africa RISING sites.	CIAT, ILRI, ICARDA, Site teams.
Unequal participation of women and marginalized groups in areas that have better potential and scope to ensure equitable benefit.	4 Develop, test and evaluate approaches for increasing women's benfits from research for development interventions	4.1 What strategies could be used to enhance women's particiation in and benefits from research for development interventions?	4.1.1 Systematic literature review to diagnose and characterize the most important constraints that hinder women and marginalized groups from achieving full potential productivity and income generation.	All Africa RISING sites.	ILRI and Site teams.

			4.1.2 Identify constraints that hinder women's participation in research for development interventions using PRA tools 4.1.3 Identify gender sensitive interventions and targets using gender related constraints		
Limited capacity of implementing partners and stakeholders to collect, analyse and interpret sex/gender-disaggregated data and understanding of the local culture.	5. Capacity building of implementing partners and stakeholders at local, district and national levels on gender	5.1 How does enhancement of knowledge and skills on gender shape partners attitudes, behavior and practices?	5.1.1 Assess the gender capacity needs of implementing partners and stakeholders at local, district and national levels 5.1.2 Training of partners and stakeholders	All Africa RISING sites.	ILRI

Summary List of Actions to Prioritise

	Priority (1 - 3)
T6 - 1: Support the establishment of sustainable seed and seedling supply systems.	
T6 - 2: Identify and introduce improved post harvest management practices.	
T6 - 3: Support the establishment of sustainable market chains for agricultural products.	
T6 - 4: Develop, test and evaluate approaches for increasing women’s benfits from research for development interventions	
T6 - 5: Capacity building of implementing partners and stakeholders at local, district and national levels on gender	

Theme 7: Knowledge Management, Exchange and Capacity Development.

Core problem or opportunity	Possible actions	Research Questions	Research Activities (including methods)	Research Locations	Partners
Many technologies and management practices that are promoted to farmers are not adopted.	1. Improve our understanding of the core contraints and opportunities that farmers are likely to prioritise.	1.1. What charactersation and diagnostic methods do we need to implement to give us a solid basis for research design?	1.1.1. Implement and document the use and outcomes of using diagnostic tools and methods (PCA, SLATE, AKT5, VCA). 1.1.2. Synthesise the strengths, weaknesses and applicability of the methods used both alone and in combination. 1.1.3. Prepare a diagnostic manual to disseminate these findings more widely.	All Africa RISING sites.	ILRI, ICRAF, CIAT, CIP, IWMI Site teams.
	2. Improve our understanding of adoption processes.	2.1. Do succesfully adopted practices share any common features and, if so, what are they?	2.1.1. Study of the adoption processes and common features of technolgies and management practices currently used by farmers.	All Africa RISING sites.	ICRAF, ILRI, IWMI, ICARDA, Site teams.

		2.1.2. Understand Concept of Sustainblity through Household, community and Regional levels to ensure there is farmer buy in from the start. 2.1.3. Set of guidelines based on the above to support adoption / scaling.		
3. Design solutions that augment rather than replace existing knowledge and practices.	3.1. What are the gaps in farmers existing knowledge that can be targeted by project innovations?	3.1.1. Review AKT5 knowledge bases to identify opportunities for knowledge strengthening. 3.1.2. Design knowledge transfer processes and media to target these opportunities (via CHEGs) 3.1.3. Ensure that this knowledge feeds into the implementation of Themes 1 - 6 via the IPs.	All Africa RISING sites.	ICRAF, ILRI, CIP, CIAT, ICARDA, IWMI Site teams
	3.2. What institutions can be strengthened or built to support peer to peer knowledge transfer?	3.2.1. Review existing community institutions (e.g. 1:5 groups, FRGs) and design Community Knowledge Exchange Groups (CKEGs) based on these.	All Africa RISING sites.	ILRI, ICRAF, Site teams, Kebele IP memberss.

		3.2.2. Design processes, tools and media to facilitate knowledge exchange within the CKEGs. 3.2.3. Establish and evaluate pilot CKEGs.		
4. Ensure that all stakeholders participate in setting the research agenda via the project's innovation platforms.	4.1. What form should IPs take to support research and development agendas effectively?	4.1.1. Establish innovation platforms at the kebele and woreda levels. 4.1.2. Establish IP process monitoring and analysis.	All Africa RISING sites.	ILRI, CIAT, Site teams, Kebele and Woreda IP members.
	4.2. What kinds of impacts can IPs facilitate (locally and at scale) and how can these be replicated more widely?	4.2.1. Establish impact monitoring and analysis. 4.2.2. Prepare guidelines to support wider scaling, via IPs or other institutions, based on the lessons learned around 4.1. and 4.2.		
5. Improve the integration of knowledge transfer channels at the research site (Woreda) level.	5.1. What linkages and processes need to be strengthened or established to enable actors to work more efficiently / effectively together?	5.1.1. Review existing organisations, approaches used and linkages.	All Africa RISING sites.	

	5.1.2. Streamline knowledge delivery processes under the aegis of the Woreda and Kebele IPs.

Summary List of Research Actions to Prioritise

	Priority (1 - 5)
T7 - 1: Improve our understanding of the core contraints and opportunities that farmers are likely to prioritise.	
T7 - 2: Improve our understanding of adoption processes.	
T7 - 3: Design solutions that augment rather than replace existing knowledge and practices.	
T7 - 4: Ensure that all stakeholders participate in setting the research agenda via the project's innovation platforms.	
T7 - 5: Improve the integration of knowledge transfer channels at the research site (Woreda) level.	